REMARKS

I. STATUS OF THE CLAIMS

Claims 20, 22, and 24-38 are currently pending. Claim 20 is amended herein to recite "a *non-crosslinked,* thermoplastic insulating layer" and to further clarify that the forming of the metallic screen occurs while the extruded insulating layer is at temperature from about 30°C to about 70°C. Claim 22 is likewise amended to ensure consistency in the claims.

Applicants amend the claims to include the word "non-crosslinked" solely in order to clarify for the Office the instant scope of the instant claims. One of ordinary skill in the art would understand that claim 20, as originally written, was directed to non-crosslinked insulating layers because thermoplastic materials are traditionally understood to be non-crosslinked. Thus, no new matter has been added since section 112 support is found in the original claims as well as the specification-as-filed, such as page 22, lines 31-33.

Further, Section 112 support is found for the clarification that forming of the metallic screen occurs while the extruded insulating layer is at temperature from about 30°C to about 70°C in the specification-as-filed, such as page 6, line 1-6, 14-15, and 28-32. Hence, no new matter has been added.

II. INTERVIEW SUMMARY

Applicants thank Examiner Tabayyon Esali for her time during the telephonic interview with Applicants' representatives on October 6, 2010.[1] The rejections in the current Office Action were discussed during the interview. In particular, Applicants' representatives explained that the cited art only disclosed methods of manufacture comprising resting/collecting steps,. The primary examiner stated that it was obvious to convert a batch process into a continuous process. Applicants' representative agreed that as a general proposition, that is often true. Applicants' representative explained, however, that at the time of the invention, persons skilled in the art perceived a need for a resting/collecting step and that the cited art provided no teaching for the person of ordinary skill to apply that would allow the removal of the resting/collecting steps in order to achieve a continuous process, as claimed. Only Applicants' specification taught and claimed such a mechanism. No agreement was reached.

III. REJECTIONS UNDER 35 U.S.C. § 103(a)

A. Claims 20-29, 33, and 36-37

The Office continues to reject claims 20-29, 33, and 36-37 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,225,749 to Pierre et al. ("Pierre") in view of WO 99/33070 to Belli et al. ("Belli") and in further view of WO 02/27731 to Castellani et al. ("Castellani").[2] *See* June 30, 2010, Office Action at 2-6 and 9-10. In

[1] Examiner Tabayyon Esali's supervisory examiner (Examiner Cleveland) was unable to attend the interview. As such, another primary examiner participated. Applicants' representatives were Anthony Hartmann and Mary Chlebowski.

[2] The Office relies on U.S. Patent No. 6,824,870 as a translation of WO/02/27731. All references to references herein to Castellani refer to the U.S. patent.

response to Applicants' reply of April 15, 2010, the Examiner simply reiterates his position that "it is obvious to combine two continu[ous] processes to have one continu[ous] process." *Id.* at 9. The Examiner further states that "Castellani teaches cooling to ambient temperature and the ambient temperature covers 30 and 27C," citing U.S. Patent Nos. 5,419,780 and 7,452,598. *Id.* at 9-10. Applicants respectfully disagree with and traverse this rejection for at least the reasons for record, as well as the following additional reasons.

Several basic factual inquires must be made in order to determine the obviousness or non-obviousness of claims of a patent application under 35 U.S.C. § 103. These factual inquiries, set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 U.S.P.Q. 459, 467 (1966), require the Examiner to:

(1) Determine the scope and content of the prior art;
(2) Ascertain the differences between the prior art and the claims in issue;
(3) Resolve the level of ordinary skill in the pertinent art; and
(4) Evaluate evidence of secondary considerations.

The obviousness or nonobviousness of the claimed invention is then evaluated in view of the results of these inquiries. *Graham*, 383 U.S. at 17-18, 148 U.S.P.Q. at 467; *see also KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1730, 82 U.S.P.Q.2d 1385, 1388 (2007).

1. The Office improperly dismisses Applicants' discovery of a source of the problem in the art, which is part of the "as a whole" inquiry.

In determining the differences between the prior art and the claims, the question under 35 U.S.C. § 103 is not whether the differences themselves would have been obvious, but whether the claimed invention *as a whole* would have been obvious. M.P.E.P. § 2141.02(I). To that end, discovering the source or cause of a problem is

part of the "as a whole" inquiry. M.P.E.P. § 2141.02(III). Further, in *KSR*, the Supreme Court affirmed *United States v. Adams*, 383 U.S. 39 (1966), which relied on the principle that "[w]hen the prior art teaches away from combining certain known elements, discovery of successful means of combining them is more likely to be nonobvious." *KSR*, 137 S. Ct. at 1740.

In the instant case, as discussed in the Amendment filed April 15, 2010, Applicants discovered at least one source for the problem that heretofore forced the prior art to apply a resting or collecting step following the coating of the insulating layer. In the instant Office Action, the Office claims to have "fully considered" Applicants' arguments but found them unpersuasive. June 30, 2010, Office Action at 9. However, the Office does not comment or attempt to refute Applicants' arguments with respect to the discovery of the source or cause of a problem in the instant case.

Applicants respectfully request due consideration to the present arguments and response if such arguments are found unpersuasive.

With respect to this issue, Applicants rely on the arguments set forth in the Amendment filed April 15, 2010, as well as the Declaration under 37 C.F.R. § 1.132 of Alberto Bareggi ("the Declaration") submitted herewith.

As described in the specification and Declaration, at the time of the invention, persons of ordinary skill in the art perceived that a resting/collecting step between the extrusion of an insulating layer and the addition of a metal screen was necessary for cables for Medium Voltage (M.V.) or high voltage rate, where cross-linked insulation is used. Specification as-filed at 2, lines 20-27; Declaration at ¶¶ 6-7.

With respect to cables with crosslinked insulating layers, persons of ordinary skill in the art recognized that the resting or collecting step allowed water to diffuse through the insulating layer so as to initiate the crosslinking process with the silane crosslinking agents in the insulating layer. Specification as-filed at 2, lines 22-27; Declaration at ¶ 8. Similarly, when peroxides were used for crosslinking the insulating layer, the resting or collecting step allowed the gases generated by the crosslinking process to diffuse out of the insulating layer and away from the cable. Specification as-filed at 2, line 28 through 3, line 5; Declaration at ¶ 8. The premature addition of a metal screen would inhibit, if not prevent, these processes from occurring, particularly since the time required for these processes can be substantial, such as hours or days. Specification as-filed at 2, lines 22-30 and at 3, lines 1-5; Declaration at ¶ 8. For example, it is Applicants' experience that without such proper degassing of the cable insulation, undesired deformations of the outer layers may result from expansion of the formed gases. Specification as-filed at 3, lines 6-10; Declaration at ¶ 9. It has also been noted that the formed gases are explosive and may ignite when the cable is laid or joined. Specification as-filed at 3, lines 14-16; Declaration at ¶ 9. Finally, in the absence of a proper degassing of the cable insulation prior to application of additional layers, an undesired porosity in the insulation may be formed which can deteriorate the electric properties of the insulating layer. Specification as-filed at 3, lines 17-19; Declaration at ¶ 9. Thus, a continuous process was not believed to be feasible for cables with crosslinked insulating layers and metal screens.

Moreover, with regard to cables with ***either*** crosslinked or non-crosslinked insulating layers, person of skill in the art saw a need for a resting/collecting step prior to

forming the metallic screen around the extruded insulating layer. If the screen is formed by helicoidally winding wires or tapes around the extruded insulating layer, a resting or collecting step is necessary for allowing a proper operation of the rotating apparatus, revolving around the cable for applying the wires or tapes unwound from spools, so that the overall process is necessarily non-continuous. Specification as-filed at 3, lines 29-31; Declaration at ¶ 10. On the other hand, if the screen was formed by longitudinally folding a circumferentially continuous metal screen around the extruded insulating layer, a resting or collecting step was deemed to be necessary also to bring the insulating layer down to room temperature, as needed for avoiding the creation of voids that would form between the metallic screen and the insulating layer of the finished cable. Specification as-filed at 4, lines 19-20; Declaration at ¶ 11.

Persons skilled in the art knew that the presence of voids inside a cable may cause the partial electrical discharges during the operation of the cable and cause breakdown of the cable or create kinks in the cable due to the buckling of the metallic screen under remarkable or successive bending actions occurring on the cable (e.g., when winding the finished cable on a reel or on a storage unit). Specification as-filed at 4, line 31 through 5, line 7; Declaration at ¶ 12. The formation of these kinks in the metallic screen has undesirable consequences since it negatively affects the mechanical resistance of the screen, in particular the fatigue failure of the metallic screen. Specification as-filed at 5, lines 8-10; Declaration at ¶ 12. Further, because a polymeric layer is generally extruded over the metallic screen, the formation of kinks, such as by voids, in the metallic screen may cause localized detachments of the

polymeric layer from the screen. Specification as-filed at 5, lines 11-13; Declaration at ¶ 12.

Thus, at the time of filing, persons skilled in the art were not aware of a mechanism that would allow them to avoid resting/collecting steps and make the process continuous. Declaration at ¶ 15; see also Specification as-filed at 5, lines 23-24 (stating "...in conventional cable manufacturing processes - according to which the process is not continuously carried out ...").

Applicants discovered at least one source for the problem that heretofore forced the prior art to apply a resting or collecting step following the coating of the insulating layer. Specifically, Applicants determined that voids form between the metallic screen and the insulating layer of the finished cable in a continuous process due to the differences in expansion properties of metals and plastics. Specification as-filed at 4, lines 21-26; Declaration at ¶ 14. Specifically, when the cable cools from a high temperature (such as >70 °C), the insulating layer shrinks faster than the metal screen, particularly when a tube has been formed by a longitudinal folding of a metal sheet. *Id.*

It was also Applicants who discovered the solution to the problem, with respect to cables with non-crosslinked, thermoplastic insulating layers, was to cool the extruded insulating layer, for example, to a temperature less than about 70°C, which allowed the process to operate continuously from feeding a conductor to forming a circumferentially closed metallic screen by longitudinally folding a metal sheet. Specification as-filed at 5, line 31 through 6, lines 1-9; Declaration at ¶ 14. Applicants also discovered that rather than cooling to room temperature (20-25°C) as seen in the prior art's resting/collecting step of their discontinuous processes, a continuous process could operate at a higher

temperature of about 30°C. Specification as-filed at 6, lines 1-2 & 9-14 and at 7, lines 2-3; Declaration at ¶ 14. The range was determined to be low enough to avoid the expansion concerns and high enough that a continuous process is practical. Declaration at ¶ 14.

Nothing in the record suggests the formation of voids was known to one of skill in the art. Nothing in the record suggests that art was aware of how to operate a continuous process and obtain an acceptable product. Nothing in the record suggests that the art was aware that cooling the cable, for example to a temperature from about 30°C to about 70°C, permitted a continuous process. Nothing in the combination of Belli, Pierre, and Castellani teaches or suggests that the claimed continuous process was feasible, let alone that there might be a reasonable expectation of success.

Because a "patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is identified" (M.P.E.P. § 2141.02(III) (citation omitted)) and "[w]hen the prior art teaches away from combining certain known elements, discovery of successful means of combining them is more likely to be nonobvious," *KSR*, 137 S. Ct. at 1740, Applicants respectfully submit that the discovery of the cause and solution of the problem of voids in the instant case is part of the required "as a whole" inquiry of obviousness.

By not considering and/or not responding to Applicants' arguments, the Office has failed to consider the claimed invention "as a whole" and, accordingly, improperly concluded that the combination was obvious.

2. There would have been no reasonable expectation of success in making a continuous process, as claimed.

In order to establish a *prima facie* case of obviousness, there must be a reasonable expectation of success. M.P.E.P. § 2143.02. During the interview, the Office reasserted that it would be obvious to form a continuous process from non-continuous processes. Applicants' agreed that such a theory may apply in some cases, but under the facts of record, there would NOT be a reasonable expectation of success in making the claimed continuous process for manufacturing an electric cable. Contrary to the Office's argument, it is not simply a matter of removing the reel of the art as a resting/collecting step.

Applicants respectfully submit that the state of the art was such that a continuous process was neither known or deemed feasible. As detailed above and in the Declaration, a person skilled in the art would have thought that resting or collecting steps were necessary in prior to forming a circumferentially closed metallic screen around a non-crosslinked, thermoplastic extruded insulating layer. In other words, it was believed that removing the resting/collecting step to achieve a continuous process was not possible. None of the art appreciated that this problem could be solved with respect to cables with non-crosslinked, insulating layers. Declaration at ¶ 15.

Even the documents cited by the Office support the analysis that the state of art at the time of the instant invention was that a person skilled in the art would not believe a continuous process was feasible, even for a cable with a non-crosslinked, thermoplastic insulating layer. For example, the Declaration explains that, in Figure 2 and 4 of Pierre, it can be seen that cable 12, which contains an extruded insulating layer, is resting on a reel. Declaration at ¶ 13. Metal strip 14 is only folded around

cable 12 after the resting step. *Id.* Thus, the process of Pierre is discontinuous. *Id.* In addition, the Declaration explains that Belli teaches winding a semi-finished cable product (which contains the extruded insulating layer) on a reel. *Id.* (citing Belli at Example 3, pages 15-17). The Declaration notes that, in Example 5, the same technique is used prior to adding a metal strip around the polymer. *Id.* (citing Belli at Example 5, pages 17-18). Further, neither reference suggests that the insulating layers of their exemplified processes are non-crosslinked and, thus, there is no appreciation that a continuous process was feasible for non-crosslinked cables. Accordingly, the Office's cited references support what was understood in the art prior to the instantly claimed invention - i.e., the need for a resting or collecting step prior to forming a circumferentially closed metallic screen around an extruded non-crosslinked, insulating layer.[3] *Id.*

Given the state of the art as described above, one of ordinary skill in the art would not have had a reasonable expectation of success in making the claimed continuous process for manufacturing an electric cable at the time of the invention. In fact, the Office does not even allege that there would be a reasonable expectation of success in the instant case, let alone providing a rationale as to why one would have such an expectation given the state of the art. *See* June 30, 2010, Office Action, generally. Accordingly, the decision of the U.S. Supreme Court, *United States v. Adams*, 383 U.S. 39 (1966), is appropriate -- the claimed invention is more likely to be

[3] Castellani adds nothing to the analysis. While it teaches a cable containing a metal screen around an insulator, Castellani does not teach a *process* for forming a circumferentially closed metal screen around an extruded insulating layer. Rather, Castellani only teaches how to prepare a cable with an insulator but without a metal screen. Castellani at col. 10, line 64 to col. 11, line 16.

non-obvious when the prior art, as here, teaches away from combining certain known process steps in the manner claimed.

3. The Office improperly dismisses Applicants' arguments regarding evidence of criticality.

In the Amendment of April 15, 2010, Applicants argued that evidence of critically for the claimed temperature range was not necessary but, nonetheless, was already part of the record. In the instant Office Action, the Office claims to have "fully considered" Applicants' arguments but found them unpersuasive. June 30, 2010, Office Action at 9. However, the Office does not comment or attempt to refute Applicants' arguments with regarding evidence of criticality.

Applicants respectfully request due consideration to the present arguments and response if such arguments are found unpersuasive.

Instant claim 20 recites, in relevant part, "[a] continuous process for manufacturing an electric cable, comprising the steps of . . . cooling the extruded insulating layer to a temperature from about 30°C to about 70°C . . . ." In finding this claim element obvious, the Office cites M.P.E.P. § 2144.05(II)(***A***), seeking evidence of criticality. Nov. 17, 2009, Office Action at 4-5 (discussing claims 21-22).

First, as discussed in the Amendment filed April 15, 2010, the Office fails to meet or even apply the ***prerequisite*** per M.P.E.P. § 2144.05(II)(***B***), which ***requires*** that the particular parameter must first be recognized as a result-effective variable, *i.e.*, "a variable which achieves a recognized result." In other words, the Office must identify evidence that the ***art*** recognizes that adjusting the temperature of an extruded insulating layer up or down achieves some desired result in the cable. Applicants respectfully submit that there is no evidence of record to suggest that the temperature of

an extruded insulating layer is a result-effective variable, nor has the Office even attempted to meet this burden.

Second, the range is critical. Applicants found the maximum temperature of the extruded insulating layer at the time of forming the circumferentially closed metallic screen thereupon to be a critical parameter, as discussed in the specification. Specification at 4, lines 14-18. Applicants noted that, if the maximum temperature of the insulating layer is higher than a predetermined threshold value, voids may be formed between the metallic screen and the insulating layer of the finished cable, which voids may cause the formation of partial electrical discharges and the formation of kinks due to the buckling of the metallic screen when the finished cable undergoes a bending action, such as during winding of the cable on a collecting reel or an a storage unit. *Id.* at 4, lines 19-20 and 29-32; at 5, lines 1-7 and 18-22.

In addition, Applicants found that it is advantageous that the insulating layer is not in a cold state when the metallic screen is formed thereon. Specification as-filed at 6, lines 14-16. In fact, if the extruded insulating layer is in a cold state, the material of the polymeric sheath which is closest to the metallic screen, and thus to the insulating layer, cools quickly with respect to the remaining polymeric sheath. *Id.*, lines 16-21. As a consequence of this quick cooling, the polymeric sheath layer closest to the insulating layer solidifies while the rest of the material is in a soft state. *Id.*, lines 22-24. This result is particularly problematic because the rigid layer prevents the polymeric sheath from shrinking onto the metallic screen to give a good tightening of the metallic screen and the polymeric sheath onto the insulating layer. *Id.*, lines 24-27.

Third, the Office's allegation that "ambient temperature covers 30 and 27C" is inappropriate. *See* June 30, 2010, Office Action at 9-10. As an initial point, it is surprising that the Office would try to apply the definition of ambient for over-heated circuit boards (US 5,419,780) and hot roofs (US 7,452,598) to ambient for manufacturing conditions of electric cables. Further, Applicants' specification already defines the range to be 20-25 °C (as-filed Specification at 6, line 2), and the Office is bound to that definition. M.P.E.P. § 2111.01(IV). Lastly, even if correct, the argument is inapplicable to dependent claim 22. In maintaining the rejection of all claims, the Office appears to not consider the temperature limitation of that claim. *See* June 30, 2010, Office Action at 9-10.

For the reasons above, Applicants respectfully submit that the Office has failed to show temperature is a result-effective variable and that the Office has failed to consider Applicants' evidence of the criticality of temperature (at both the maximum and minimum ranges claimed).

For at least all the reasons presented above, Applicants respectfully submit the instant claims are patentable over the cited documents and request withdrawal of the rejection.

B. Claims 30, 33, and 34

The Office continues to reject claims 30, 33, and 34 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Pierre, Belli, Castellani, and U.S. Patent No. 6,501,027 to Belli et al. ("the '027 patent"). *See* Nov. 17, 2009, Office Action at 6-7 and 9-10. In support of the rejection, the Office relies on the arguments set forth by the

Office that "Pierre, Belli and Castellani teach the limitation[s] of claim 29 as discussed above." *Id.* at 6. Applicants respectfully disagree with and traverse this rejection for at least the reasons for record, as well as the following additional reasons.

As discussed above, Pierre, Belli and Castellani fail to render claim 29 obvious, whether considered alone or in combination. Further, the '027 patent does not cure the deficiencies discussed above, as tacitly admitted by the Office's reliance on the disclosure of the '027 patent for other purposes. Accordingly, Applicants respectfully submit that claims 30, 33, and 34 are patentable over the combination of Pierre, Belli, Castellani and the '027 patent and thus, request withdrawal of the rejection.

C. Claims 31 and 32

The Office continues to reject claims 31 and 32 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Pierre, Belli, Castellani, and WO 03/088274 to Belli et al. ("WO '274"). *See* Nov. 17, 2009, Office Action at 7-8 and 10-11. In support of the rejection, the Office relies on the arguments set forth by the Office that "Pierre, Belli and Castellani teach the limitation[s] of claim 29 as discussed above." *Id.* at 7. Applicants respectfully disagree with and traverse this rejection for at least the reasons of record, as well as the following additional reasons.

As discussed above, Pierre, Belli and Castellani fail to render claim 29 obvious, whether considered alone or in combination. In addition, WO '274 does not cure the deficiencies discussed above, as tacitly admitted by the Office's reliance on the disclosure of WO '274 patent for other purposes. Accordingly, Applicants respectfully

submit that claims 31 and 32 are patentable over the combination of Pierre, Belli, Castellani and WO '274 and thus request withdrawal of the rejection.

D. Claim 35

The Office continues to reject claim 35 under 35 U.S.C. § 103(a) as being unpatentable over Pierre, Belli, Castellani and U.S. Patent No. 6,416,813 to Prats ("Prats"). In support of the rejection, the Office relies on the arguments set forth by the Office that "Pierre, Belli and Castellani teach the limitation[s] of claim 20 as discussed above." *Id.* at 8. *See* Nov. 17, 2009, Office Action at 8-9 and 10-11. Applicants respectfully disagree with and traverse this rejection for at least the reasons of record, as well as the following additional reasons.

As discussed above, Pierre, Belli and Castellani fail to render independent claim 20 obvious, whether considered alone or in combination. In addition, Prats does not cure the deficiencies discussed above, as tacitly admitted by the Office's reliance on the disclosure of Prats for other purposes. Accordingly, Applicants respectfully submit that claim 35 is patentable over the combination of Pierre, Belli, Castellani and Prats and thus request withdrawal of the rejection.

E. Claim 38

The Office continues to reject claim 38 under 35 U.S.C. § 103(a) as being unpatentable over a combination of Pierre, Belli, Castellani, and WO 2002/047092 to Belli et al. ("WO '092"). *See* Nov. 17, 2009, Office Action at 9 and 10-11. In support of the rejection, the Office relies on the arguments set forth by the Office that "Pierre, Belli

and Castellani teach the limitation[s] of claim 20 as discussed above." *Id.* at 8. Applicants respectfully disagree with and traverse this rejection for at least the reasons of record, as well as the following additional reasons.

As discussed above, Pierre, Belli and Castellani fail to render independent claim 20 obvious, whether considered alone or in combination. In addition, WO '092 does not cure the deficiencies discussed above, as tacitly admitted by the Office's reliance on the disclosure of WO '092 for other purposes. Accordingly, Applicants respectfully submit that claim 38 is patentable over the combination of Pierre, Belli, Castellani and WO '092, and thus request withdrawal of the rejection.

CONCLUSIONS

Applicants respectfully request that this Amendment under 37 C.F.R. § 1.116 be entered by the Office, placing claims 20, 22, and 24-38 in condition for allowance. Applicants submit that the proposed amendments of claims 20, 22, and 24-38 do not raise new issues or necessitate the undertaking of any additional search of the art by the Office, since all of the elements and their relationships claimed were either earlier claimed or inherent in the claims as examined. Therefore, this Amendment should allow for immediate action by the Office.

Finally, Applicants submit that the entry of the amendment would place the application in better form for appeal, should the Office dispute the patentability of the pending claims.

In view of the foregoing remarks, Applicants submit that this claimed invention, as amended, is patentable over the references cited against this application. Applicants

therefore requests the entry of this Amendment, the Office's reconsideration of the application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to Deposit Account No. 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,
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Dated: November 29, 2010

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Attachment: Declaration under 37 C.F.R. § 1.132 of Alberto Bareggi.